

# Effect on Dental Hygiene Students of a Substance Use Simulation Conducted with Nursing Students

Ann M. Mitchell, Angelina Riccelli, Lynn Boucek, Kathryn R. Puskar, Holly Hagle, Dawn Lindsay

*Abstract:* Dental professionals have an opportunity to screen for substance use, provide targeted feedback based on patients' oral health, provide patient education, and refer for further assessment as needed. The aim of this study was to assess the impact on dental hygiene students of an interprofessional Screening, Brief Intervention, and Referral to Treatment (SBIRT) educational intervention with standardized patients as a tool for initiating discussions on alcohol and drug use with patients. Starting in 2015, dental hygiene students in two classes at the University of Pittsburgh participated with nursing students in one and a half hours of didactic instruction followed within a ten-week period by SBIRT simulation scenarios utilizing standardized patients, with subsequent debriefing of students by faculty. Students' attitudes were assessed before and after the didactic session and immediately after the SBIRT simulation, using the Alcohol and Alcohol Problems Perceptions Questionnaire and the Drug and Drug Problems Perceptions Questionnaire. All 67 dental hygiene students in the program at the time participated in the educational intervention and surveys. The results showed significant positive changes in role security, defined as the acceptance of SBIRT delivery as part of their role identity as dental hygienists, following the intervention. This study found that the IPE intervention with dental hygiene and nursing students improved the dental hygiene students' attitudes through using SBIRT.

Ann M. Mitchell is Professor, Health and Community Systems, University of Pittsburgh School of Nursing; Angelina Riccelli is Associate Professor and Director of Dental Hygiene, University of Pittsburgh School of Dental Medicine; Lynn Boucek is CRNP, UPMC Southside Walk-In Primary Care Clinic, Pittsburgh, PA; Kathryn R. Puskar is Professor and Associate Dean for Undergraduate Education, University of Pittsburgh School of Nursing; Holly Hagle is Director of National SBIRT ATTC, Institute for Research, Education, and Training in Addictions, Pittsburgh, PA; and Dawn Lindsay is Director of Research and Evaluation Services, Institute for Research, Education, and Training in Addictions, Pittsburgh, PA. Direct correspondence to Prof. Ann M. Mitchell, University of Pittsburgh School of Nursing, 3500 Victoria Street, 415 Victoria Building, Pittsburgh, PA 15261; ammi@pitt.edu.

*Keywords:* dental hygiene education, dental hygiene, allied dental education, nursing education, interprofessional education, brief intervention, substance use, substance abuse, alcohol and other drug use, standardized patients

*Submitted for publication 8/24/17; accepted 1/8/18  
doi: 10.21815/JDE.018.052*

In the 2013 National Survey on Drug Use and Health (NSDUH), 26.4 million people in the U.S. aged 12 years or older reported current illegal drug use, and 60.1 million reported binge drinking in the past month.<sup>1</sup> Excessive alcohol use alone led to 88,000 deaths in the U.S. each year from 2006 to 2010.<sup>2</sup> The 2013 NSDUH survey also found that, while 22.7 million people in the U.S. needed treatment for alcohol or other drug use problems, only 2.5 million received specialty care.<sup>1</sup> These findings reveal a very large gap in the identification, care, and treatment of people who use and misuse substances. According to Neff et al., 60% to 70% of U.S. adults visit dental providers annually, offering an opportunity to address substance use as it relates to patients' oral health.<sup>3</sup> Dental professionals have an opportunity

to screen for substance use (alcohol, tobacco, and other drugs), provide targeted feedback based on the patient's oral health, provide patient education, and refer for further assessment and treatment as needed.<sup>4</sup>

Screening, Brief Intervention, and Referral to Treatment (SBIRT) is a comprehensive, integrated public health approach to the delivery of early intervention for persons with substance use disorders or who are at risk for developing one.<sup>5</sup> SBIRT reinforces low risk behaviors in those abstaining or using at low levels, provides interventions for individuals with risky substance behaviors, and uses referrals for those with more serious substance use problems.<sup>6</sup> The extent of screening for alcohol and other drug use by dental professionals is not well documented. Neff et al. described development of the first brief

intervention for heavy drinkers to be used in a dental practice.<sup>3</sup> Their study found that SBIRT was an effective approach and that patients were highly receptive to delivery of preventive information by dental hygienists. Furthermore, that study highlighted the potential benefits of SBIRT integration into routine dental and dental hygiene practice.

Health care professions students must develop the skills necessary for effective SBIRT utilization. One approach to achieving this is through the use of simulation learning strategies. In health care, the term “simulation” was defined by Salas et al. as “instruction that makes use of facsimiles of clinical contexts wherein learners interact to acquire knowledge, skills, and affective elements that will ultimately transfer to the real clinical context.”<sup>7</sup> Scherer et al.’s study with nurse practitioners assessed the use in simulations of standardized patients (SPs)—individuals trained to present an illness or situation in a realistic manner to provide helpful feedback to the learner.<sup>8</sup> SPs create an atmosphere that focuses attention on helping students develop appropriate clinical behaviors and communication. Scherer et al. also found that the simulation with SPs was effective as a learning strategy to optimize teamwork in health care and thus promote interprofessional education (IPE) and interprofessional collaborative practice (IPCP). IPE occurs when two or more students from different disciplines learn with and from each other to develop effective collaboration and improve health outcomes, and IPCP occurs when health care professionals from different disciplines work together to deliver the highest quality care to patients and their families. Based on reports from the Institute of Medicine, Weinstein et al. argued that health professionals should be educated “to deliver patient-centered care as members of an interdisciplinary team.”<sup>9</sup>

Scherer et al.’s study paired family nurse practitioners with student dentists to enhance the education of both groups.<sup>8</sup> SPs were used to ensure a safe and supervised learning environment and to provide performance feedback and evaluate student performance. The results of their study provided evidence to support using simulation as a means to enhance learning in IPE. The aim of our study was to assess the impact on dental hygiene students of an IPE SBIRT educational intervention with SPs as a tool for initiating discussions on alcohol and drug use with patients.

---

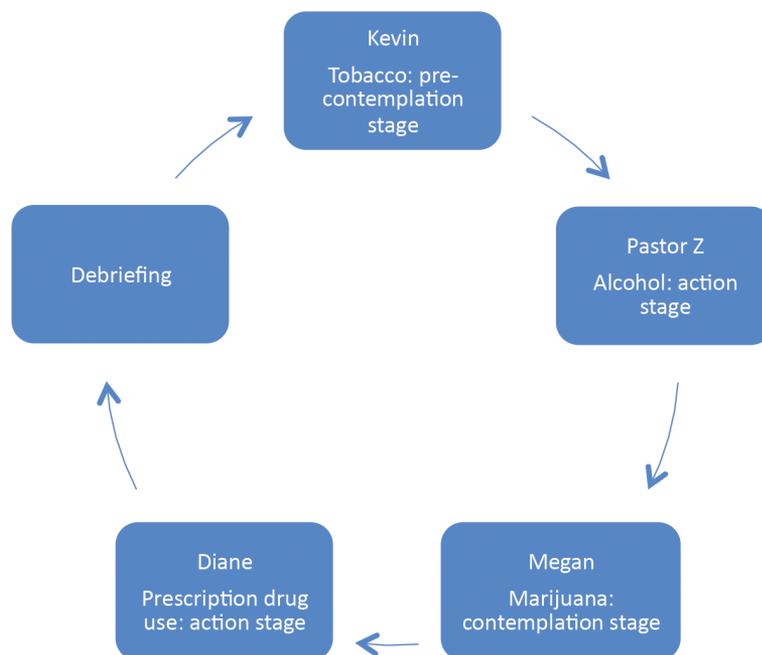
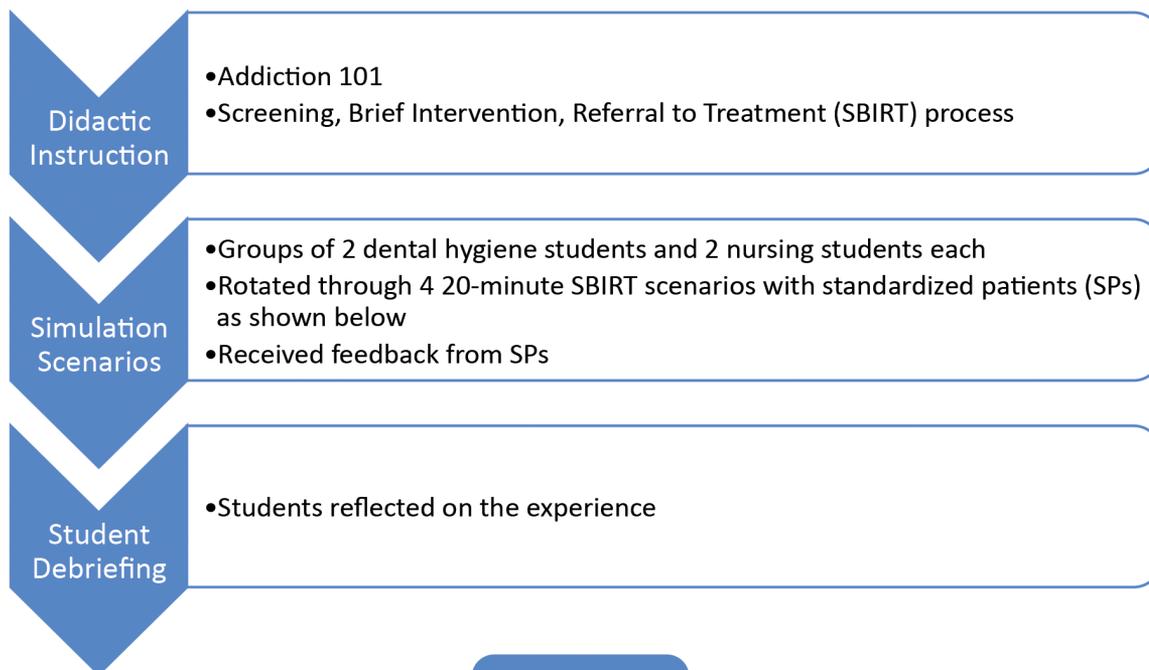
## Methods

This study was determined to be exempt from oversight by the University of Pittsburgh Institutional Review Board (PRO12090386). To familiarize dental hygiene students with the evidence-based practice of SBIRT, while simultaneously promoting IPCP with the nursing and dental hygiene students, the University of Pittsburgh School of Nursing partnered with the Institute for Research, Education, and Training in Addictions and the University of Pittsburgh School of Dental Medicine’s Dental Hygiene Program.

The intervention consisted of one and a half hours of didactic instruction followed by four simulation scenarios utilizing SPs and subsequent debriefing of students by faculty (Figure 1). Students were divided into four groups, each consisting of two nursing students and two dental hygiene students; these groups then participated in the four 20-minute SP sessions. During the sessions, students were expected to administer validated screening tools, utilize brief intervention techniques, use motivational interviewing techniques, and incorporate referral to treatment information as needed. Each scenario presented a distinctive opportunity for learning. The scenarios made use of varied situations, ranging from a 19-year-old college baseball student who uses tobacco products to a single mother struggling with at-risk alcohol use. After roleplaying the scenario with the students, the SPs provided constructive performance feedback, helping students to identify both areas of strength and areas that needed improvement.

The intervention described was integrated into the dental hygiene curriculum at the University of Pittsburgh School of Dental Medicine for the period of this study. Therefore, all students in their first year of the two-year dental hygiene program participated.

The students’ attitudes were assessed with two validated instruments administered before the didactic training (pre-training), after the didactic training (post-training), and after the SBIRT simulation sessions (post-simulation). The Alcohol and Alcohol Problems Perceptions Questionnaire (AAPPQ) is a 30-item instrument measuring role security and therapeutic commitment to working with patients with alcohol-related problems. “Role security” refers to respondent’s acceptance of SBIRT delivery and other forms of substance use discussions with



**Figure 1. Overview of intervention including standardized patient rotation used in study**

patients as part of the identity of being a dental hygienist, and “therapeutic commitment” refers to the commitment to use such methods in clinical practice. The Drug and Drug Problems Perceptions Questionnaire (DDPPQ) is a 22-item instrument measuring the same constructs pertaining to patients with

drug and drug-related issues. Both instruments use a Likert scale with response options from 1=strongly disagree to 7=strongly agree. Participants evaluate a given statement (e.g., “I feel I have the right to ask patients questions about their drinking when necessary”) and select the number that correlates with their

agreement. The questionnaires have demonstrated excellent reliability and validity.<sup>10,11</sup> Finally, we conducted exit interviews with the dental hygiene students to help assess the benefits of this IPE exercise.

## Results

All 67 dental hygiene students enrolled in the program at the time of the study participated in the educational intervention and completed the evaluation instruments at all three time points. The participating students were all female (100%) and predominantly white (n=64, 96%). The mean age of the sample was 21.4 years (SD=3.0). The nursing students were also primarily white females and were slightly older than the dental hygiene students on average (mean=24.2, SD=3.7).

On the AAPPQ, significant effects across time points were found for role security:  $F(2, 126)=43.1$ ,  $p<0.01$  (Table 1). Post hoc contrasts showed that this overall difference was explained fully by the increase from pre-training to post-training ( $F(1, 63)=69.53$ ,  $p<0.01$ ), while scores from post-training to post-simulation did not change significantly. For the therapeutic commitment subscale, no significant effects over time were found.

On the DDPPQ, significant effects across time points were also found for role security:  $F(2, 132)=34.2$ ,  $p<0.01$  (Table 2). Post hoc contrasts showed that this overall difference was explained fully by the increase from pre-training to post-training ( $F(1, 66)=42.0$ ,  $p<0.01$ ), while scores from post-training to post-simulation did not change significantly. Similar to the AAPPQ, no significant effects over time were found for the therapeutic commitment subscale of the DDPPQ.

In the exit interviews, the students reflected on their experiences using SBIRT and working interprofessionally with the nursing students. Among their comments were the following: “I think the training was very helpful. Patients open up to us more than with the dentist and we can obtain more information that will positively impact patient treatment”; “The simulation and use of actors prepared me for interviewing real patients”; “This training provides the opportunity to train other dental professionals once we’re part of the dental workforce”; and “I thought the interprofessional collaboration with the [School of Nursing] is a great opportunity and preparation for private practice. It conveys that we’re not just cleaning teeth.”

**Table 1. Dental hygiene students’ results on alcohol and alcohol problems perceptions questionnaire (N=67)**

Measure	Pre-Training		Post-Training		Post-Simulation		F(2, 126)	p-value
	Mean	SD	Mean	SD	Mean	SD		
Role security	2.97	0.65	3.65	0.63	3.73	0.59	43.10	<0.01
Therapeutic commitment	3.13	0.66	3.32	0.39	3.28	1.02	1.27	0.29

Note: Responses were on scale from 1=strongly disagree to 7=strongly agree; higher mean scores indicated higher levels of role security and therapeutic commitment to working with patients with alcohol-related problems. The “Pre-Training” assessment took place prior to the didactic session; the “Post-Training” assessment took place after the didactic session; and the “Post-Simulation” assessment took place after the SBIRT simulation.

**Table 2. Dental hygiene students’ results on drug and drug problems perceptions questionnaire (N=67)**

Measure	Pre-Training		Post-Training		Post-Simulation		F(2, 132)	p-value
	Mean	SD	Mean	SD	Mean	SD		
Role security	2.97	0.62	3.51	0.64	3.70	0.63	34.18	<0.01
Therapeutic commitment	3.25	0.72	3.36	0.54	3.47	1.01	1.86	0.16

Note: Responses were on scale from 1=strongly disagree to 7=strongly agree; higher mean scores indicated higher levels of role security and therapeutic commitment to working with patients with drug and drug-related issues. The “Pre-Training” assessment took place prior to the didactic session; the “Post-Training” assessment took place after the didactic session; and the “Post-Simulation” assessment took place after the SBIRT simulation.

---

## Discussion

Excessive alcohol and drug use remains a public health problem in the U.S., and is associated with numerous health conditions, including oral health issues.<sup>1-3</sup> This study sought to assess the attitudes of dental hygiene students using SBIRT, an intervention used to assist patients in the modification of behaviors around tobacco, alcohol, and other drugs. In addition, we sought to increase interprofessional collaboration between the dental hygiene and nursing students. The study found that, after the intervention, the dental hygiene students had significantly higher levels of role security for working with patients with alcohol- and drug-related problems.

It is imperative that health care providers seek novel and innovative approaches to combat the risky use of alcohol and/or other drugs. Because 60% to 70% of U.S. adults have been reported to visit dental providers annually<sup>3</sup> and because many high-risk individuals often receive regularly scheduled preventive dental care, dental hygienists are in a distinctive position to offer SBIRT services. Neff et al. found that patients were receptive to preventive information delivered by dental hygienists and that, by incorporating SBIRT techniques into their routine dental care regime, they reduced the harm of substance misuse on patients' health, optimized patient outcomes, and improved patients' overall dental and systemic health.<sup>3</sup>

Our study found that the dental hygiene students' role security for screening patients for alcohol and drug use improved significantly from pre- to post-training. These results support the value of educational efforts with SPs for dental hygiene students to expand their roles in screening for substance use (alcohol and other drug use) as it relates to presenting oral health conditions, as was found in other studies with health professions students.<sup>7,8</sup> The dental hygiene students in our study also showed improvement in their commitment to conduct SBIRT, and while not addressed directly in the study, these increases as a result of experiencing the IPE intervention with nursing students may also have increased their appreciation of interprofessional practice.

A limitation of our study is that it was conducted with a small and generally homogeneous sample (young white females). This small sample size and the non-diverse participants limit the generalizability of the results, as well as the fact that it was conducted

in only one dental hygiene program. The study also did not address or control for other factors that may have influenced the change in attitudes beyond the intervention, nor did it consider the effectiveness of the SBIRT approach versus other drug and alcohol interview approaches taught in dental hygiene programs. Future research could include a larger and more diverse sample of both dental hygiene students and nursing students, as well as measuring the impact on participants' attitudes toward IPE and interprofessional practice of this and other types of approaches that teach drug and alcohol interviewing.

---

## Conclusion

This study demonstrated the potential benefits of integrating SBIRT into dental hygiene education as the students' perceived acceptance of SBIRT as part of their role and their commitment to using SBIRT to address substance use among patients increased as a result of the intervention. These results suggest another way to prepare dental hygiene students to have a professional role in screening and early intervention for substance use.

---

## Acknowledgments

This study was supported by funds from the Division of Nursing (DN), Bureau of Health Professions (BHPr), Health Resources and Services Administration (HRSA), Department of Health and Human Services (DHHS) under Grant D09HP25025. The information or contents and conclusions are those of the authors and should not be construed as the official position or policy of, nor should any official endorsement be inferred by, the DN, BHPr, HRSA, DHHS, or the U.S. Government.

---

## REFERENCES

1. National Survey on Drug Use and Health report: substance use and mental health estimates from the 2013 national survey on drug use and health—overview of findings. Rockville, MD: Substance Abuse and Mental Health Services Administration, Center for Behavior Health Statistics and Quality, 2014.
2. Centers for Disease Control and Prevention. Fact sheet: alcohol use and your health. 2016. At: [www.cdc.gov/alcohol/fact-sheets/alcohol-use.htm](http://www.cdc.gov/alcohol/fact-sheets/alcohol-use.htm). Accessed 21 Aug. 2017.
3. Neff JA, Walters ST, Braitman AL, et al. A brief motivational intervention for heavy alcohol use in dental practice settings: rationale and development. *J Health Psychol* 2012;18(4):542-53.

4. Denisco RC, Kenna GA, O'Neil MG, et al. Prevention of prescription opioid abuse: the role of the dentist. *J Am Dent Assoc* 2011;142(7):800-10.
5. McCance-Katz EF, Satterfield J. SBIRT: a key to integrate prevention and treatment of substance abuse in primary care. *Am J Addictions* 2012;21(2):176-7.
6. Agerwala SM, McCance-Katz EF. Integrating screening, brief intervention, and referral to treatment (SBIRT) into clinical practice settings: a brief review. *J Psychoactive Drugs* 2012;44(4):307-17.
7. Salas E, Paige JT, Rosen MA. Creating new realities in health care: the status of simulation-based training as a patient safety improvement strategy. *BMJ Qual Saf* 2013;22(6):449-52.
8. Scherer YK, Anders PL, Antonson DE, et al. Incorporating standardized patients into an interprofessional oral-systemic health practicum. *J Nurse Practitioners* 2015; 11(4):e29-35.
9. Weinstein RS, Brandt BF, Gilbert JH, Schmitt MH. Bridging the quality chasm: interprofessional teams to the rescue? *Am J Med* 2013;126(4):276-7.
10. Gorman DM, Cartwright AKJ. Implications of using the composite and short versions of the alcohol and alcohol problems perception questionnaire (AAPPQ). *Addiction* 1991;86(3):327-34.
11. Watson H, Maclaren W, Kerr S. Staff attitudes towards working with drug users: development of the drug problems perceptions questionnaire. *Addiction* 2007;102(2):206-15.